THE FOREST PROBLEMS OF CALIFORNIA

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Forest Service

United States Department of Agriculture

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FOREWORD

The people of California know that the forests of California are an integral part of their State's economy. A wealthy region, richly endowed by nature, California's prosperity stems from no single industry but rather from four basic extractive industries--agriculture, mining, lumbering, and fisheries--and from the processing industry or manufacturing.

In 1939, the value of lumber and timber products in California was 46 million dollars, not to mention other contributions of the forests such as grazing, recreation, wildlife and usable water. Of the State's total industrial payroll, from 10 to 15 percent is paid by the lumber and wood products industries which directly support about 175,000 people. Moreover, in using about twice the average amount, California is the heaviest per capita consumer of lumber in the United States. Although roughly one-third of its production is shipped out of the State, California consumes 1½ to 2 times as much lumber as it produces and therefore large quantities are imported, mainly from her sister States of Oregon and Washington. Freight payments on forest products in California averaged 7½ million dollars annually over a recent 15-year period.

On a national scale too, California's forests command attention, for lumber from its 375 mills builds homes from Maine to Florida and penetrates into every State. Although our commercial forest lands are only a mere 3 percent of the Nation's total, these same lands bear 12 percent of the country's sawtimber stand. As number three State in lumber production, California carries more than its share of the load, and so great is the burden that its timber budget of balancing growth against drain is badly out of kilter--in fact, the ratio of growing only one board foot of sawtimber for every six that are removed is the poorest in the land. Even worse is the truth that new-grown wood is considered inferior in quality to old-growth virgin timber.

Californians of course know well the splendid pine and pine-fir forests of the interior, while the famous coastal redwood forests are world-renowned. These are the two major forest regions. The 12 million acres of the pine region support 156 billion board feet of timber, while the 1½ million acres of the redwood region contain 57 billion board feet, which is virtually all of the world's supply of this specialty wood. Also classed as forest lands, though non-commercial, are the woodland and chaparral-covered slopes of the southern California mountains whence comes the vital life-giving water for the citrus industry.

People are becoming more and more aware that the forest problem of the Nation and of California is much broader and goes much deeper than one merely of timber supply; that it has to do with human beings and with some of their pressing problems such as rural unemployment,

rural income, and stability and security for labor, for industry, and for social and economic structures of communities and regions. Ownership of forest land is a natural breakdown for discussion of forest problems; moreover ownership is so complex, diversified and interlocking that, in itself, it is responsible for certain major problems. Before going into these, however, the instability of ownership should be mentioned.

California is a public domain State, for when its territory was ceded to the United States by Mexico in 1846, title to all lands vested in the Federal Government, with the exception of a few Spanish grants which this country honored. Following a land disposal policy suited to the more humid East, large transfers of land took place from Federal to private ownership, from Federal to State, from State to private, and from one private owner to another. In recent years, however, the trend has reversed and land is flowing from private ownership back to county, State and Federal control. This instability of tenure is incompatible with the successful practice of forest management.

As Table 1 indicates, forest land ownership falls into two main categories, private and public; private forest land into two main groups, farm holdings, and industrial and other non-farm holdings; public ownership into holdings of communities, of the State, of lands under Federal control such as the Indian reservations, and of such Federal holdings as the National Forests.

PRIVATE OWNERSHIP

The 341 million acres of privately-owned forest land in the United States not only comprise three-fourths of the total acreage but also furnish 95 percent of all the timber cut in the country. Private forest land supports primary and secondary plant investments of about 3 billions of dollars. Directly and indirectly, it supports economic and social structures--including schools, churches, and hospitals--of rural and urban communities and broad regions, and about one-tenth of a population of more than 130 million people.

In California private enterprise controls half the commercial forest land, but this is not the whole story for that half is the cream of the crop. About 60 percent of the 213 billion board feet of sawtimber is on these lands as well as 60 percent of the current growth. Eighty-eight percent of the annual cut comes from private lands, which are the most accessible, the most productive, and the best forest lands in the region. Practically all of the redwood timber and the most productive parts of the pine belt are in private ownership. Private forest resources contribute the major economic substance to the population in 15 California counties, and to a lesser degree in 10 additional counties. The direct investment in the forest industry is about 500 million dollars exclusive of investments of dependent communities servicing the industry.

In addition to wood products, private commercial forest lands have other values. They supply forage for livestock and wildlife, afford opportunities for recreation, and often have great worth in watershed protection.

In private ownership there are nearly 18 million acres of non-commercial forest which include pinon-juniper stands east of the Sierra, and oak woodlands along the western Sierra foothills, as well as the critical chaparral water-yielding lands of the coast range. Nowhere else in the country are non-commercial forest lands as valuable as in California, where estimates of their worth for watersheds have run as high as $950 per acre on certain critical areas. The agricultural economy of southern California would collapse without this forest land which makes it possible to put more water to work.

Table 1. - The Ownership of Forest Lands in California

Ownership class	Total	Commercial [1]	Non-commercial [2]
	thousand acres	thousand acres	thousand acres
Private			
Industrial and other	19,073	6,473	12,600
Farm woodland	5,426	326	5,100
	24,499	6,799	17,700
Public			
State, county, and municipal	649	45	604
National forests	15,986	6,696	9,290
Indian reservations	527	115	412
Other Federal	6,498	-	6,498
Total	23,660	6,856	16,804
All classes	48,159	13,655	34,504

[1] Commercial forest land - land available and capable of producing timber of commercial quantity and quality under present or reasonably conceivable future conditions.

[2] Non-commercial forest land:

(a) Commercially valuable land in parks, preserves, etc., withdrawn from timber use.

(b) Land chiefly valuable for purposes other than timber production, such as pinon-juniper, chaparral, remote and inaccessible alpine ranges, and other areas which appear to be permanently out of the commercial timber-producing class because of low productivity or extreme inaccessibility. Much of the area has an important value in protecting watersheds, preventing or reducing soil erosion, protecting wildlife, providing game cover, etc.

The crux of the State's forest problem lies with these private forest lands, which include 5.5 million acres of pine timberland, 1.4 million acres of redwood, and 18 million acres of water-yielding protection forest.

Problems of Forestry in Industrial and Other Non-farm Ownership

In a nutshell, the main trouble with forest industry in both the pine and redwood regions is over-investment in timber and mill with resulting pressure to liquidate. Call it bad business judgment, the natural result of Federal land policies, or the penalty of unlucky speculation, but here is a very difficult situation, and the problem that confronts us is - what to do about it?

There are 70 billion board feet of timber on private forest lands in the pine region; the acreage ratio of virgin timber to second growth is about fifty-fifty, and these private lands carry a total assessed valuation of nearly 40 million dollars. In the redwoods, comparable figures are 54 billion feet of timber; twice as much virgin acreage as second growth, and a valuation on the lands practically as much as on the pine. Most of these areas occur in the relatively large holdings of lumber and railroad companies. The largest owner of pine timber controls 850,000 acres, and a majority of the main industrial owners have over 10,000 acres. In the redwood, ownerships are smaller, but here again more than 10,000 acres is quite common. The redwood region of course is unique--carrying the heaviest stands of timber in the world: 450,000 board feet per acre on a 40-acre tract; 1,000,000 board feet on a single acre.

In the early days, these timberlands of California drifted into private title as a result of grants to railroads, various land disposal laws and other means, some of which undoubtedly were on the shady side.

Investors thought there was going to be a timber famine for the East. The Lake States and the South were cut out or going, and they did not realize that mature stands, since they have no net growth, are unproductive and therefore do not increase in real value. Interest charges on investment mounted as did taxation and protection costs; big mills were built to get as large a monetary return as possible in a short time, and the result is what is known as the "philosophy of quick liquidation." Economic laws functioned inexorably. When investment in land, timber, logging and milling runs up to $200 per thousand board feet of annual cut, as it sometimes does in parts of the United States, a man cannot meet payrolls if these same thousand feet of lumber sell for $35. He naturally enough wants to get "out from under," and the sooner the better.

One result of all this is excessive sawmill capacity with manufacturing ability far greater than growth possibilities on tributary forest lands. Destructive logging practices which ripped and gutted the land made forest regeneration more difficult than ever. High-lead and slack-line logging, which is very destructive to the remaining stand, still brings in over one-fourth of the redwood harvest each year. One and a quarter million acres of private forest land are restocking poorly or not at all in California.

Taxation, too, in the form of local property taxes, are blamed by private owners as contributing to quick liquidation. Taxes are an

important element of cost, particularly where forest stands are depleted, but the tax handicap has perhaps been exaggerated. Generally speaking, however, administration of the forest property tax is often faulty; and assessments may be erratic and inaccurate. To be sure, California has a non-optional forest tax law that exempts immature forest trees 40 years or less, or trees on land from which 70 percent of all trees over 16 inches in diameter have been cut. This law has had little effect because of the widespread practice of gross undervaluation in California, and the custom of assessors to recognize no value anyway in young timber stands such as those exempted. The law does, however, provide a safeguard against future burdensome taxation of immature forests. Depletion of the forest resources with attendant reduction of the tax base is partially responsible for over-assessment on remaining timber stands.

All of the above leads to forest deterioration, but what is more important, to breakdowns in community and regional stability, to neglect of social obligations to labor and to widespread rural distress. Ghost towns are not wanted in California.

As Table 2 indicates, only a small part of the commercial forest land in industrial and other non-farm ownership is now under forest management. No redwood lands and only 6 percent of the pine lands come under this grouping. In the country as a whole, only about 215 industrial operations involving less than 11.5 million acres are now on a sustained yield basis. Nevertheless, progress has been made, for about 45 percent of both pine and redwood lands are under extensive though not sustained yield management.

Although there have been some substantial and gratifying advances, economic forces favoring liquidation are still powerful. Operators need help in maintaining forest lands in productive condition, in blocking up their properties so there will be proper balance between young and mature timber, and in reducing plant capacity to growth potentialities. If the public is to offer this help through its State or Federal governments in the form of fire protection, insect and disease control, forest credits, taxation relief, planting, and other types of aid, the public must have a valuable consideration in return for its assistance. The eventual consideration will be community stability, a prosperous and enduring regional economy--in short, human well being; the immediate consideration should be operator compliance with sound forest management practices.

In addition to the timber problems on forest lands in industrial and other non-farm ownership, there are problems of water, range and recreation as a result of the services which forests render in those fields. Within the boundaries of California are approximately 18 million acres of non-commercial forest land in private ownership, and less than one-third of this may be classed as farm woodland. Some of it is pinon-juniper country, some is land of very low tree growing capacity, but most is chaparral and woodland in the north and south coast ranges.

Table 2. - Status of Forest Practice on Privately-owned Commercial Forest Lands (Industrial) in California

Management Class	Pine Region		Redwood Region	
	Area	Percent	Area	Percent
	thousand acres		thousand acres	
Total area	5,135	100	1,338	100
Intensive sustained-yield management	0	-	0	-
Extensive sustained-yield management	313	6	0	-
Extensive management, not sustained yield	2,389	47	592	44
Total under management	2,702	53	592	44
Additional lands partially productive, with some fire protection but without assurance of future management	2,433	47	746	56

Over-grazing and burning are the two most common practices that spell disaster on these lands. Economic pressure or lack of knowledge explains most such occurrences which unfortunately are common. Some of the more direct results of disturbing the vegetative cover are the silting-up of reservoirs, such as the Morena reservoir in San Diego County; the periodic flooding of intensively cropped lands by rivers like the Pajaro and Salinas, and even the occurrence of floods that injure urban communities. The damage which has occurred in Gilroy, Watsonville, Glendale, and Pasadena, is attributable in part to misuse of privately-owned watersheds. Fresh in our memories are the spring floods of 1940 which inundated 635,000 acres in northern California and caused 12 million dollars property damage in 35 counties. Occurrences of this kind indirectly lead to uncertainty in irrigation agriculture, in rural labor conditions, in community income, in the business of common carriers, and in the livestock industry which depends on privately-owned forest ranges for the support of 85,000 cattle.

Problems of Farm-owned Forests

The commercial farm woodlands of California, although covering only 326,000 acres, constitute an important problem in the second-growth pine belt along the west slope of the Sierra Nevada. Here lie many small tracts of untended second-growth pine that are only now becoming merchantable--volunteer stands which sprang up following the logging and fires of early pioneer days. Repeated fires and other careless practices have slowed the growth and reduced the volume of wood, but the trees have come on regardless, probably because they are on one of the finest timber-growing sites in the State. There are now on farm woodlots over $1\frac{1}{2}$ billion board feet of sawtimber in the pine region, and one million feet in the redwood region.

Elsewhere in the United States, the 139 million acres of farm forests, 95 percent of which lie east of the Great Plains, constitute a major crop problem on American farms. Despite the fact that they occupy more acres than any other crop and furnish building materials, posts, and fuelwood to $3\frac{1}{2}$ million farmers, the farm forests have received less constructive effort, and more abuse, than any other farm crop with the possible exception of natural pasture.

In California's second-growth pine belt, there are small industrial and absentee owners as well as farmers, but the forest problems of all are somewhat analogous in this particular zone where the agricultural economy inseparably links forestry, grazing, and cultivated crops. Lack of appreciation for woodland products is one major reason why the possibility of sustained timber cropping has been largely overlooked. The local people are beginning to realize, however, that in addition to customary utilization for mine timbers, posts, fuelwood, and lumber, their second-growth pine is finding a growing market as piling and veneer bolts for box factories.

Another major cause for the lack of forest management on these lands is that small forest owners as a class have labored under some very serious handicaps. Some of these are, for example, poorly equipped and run sawmills and other wood utilization plants, unsatisfactory methods of grading, measuring, and pricing raw materials, serious lack of bargaining power and of organizations through which small owners can pool their interests, lack of skill and of capital to provide better manufacturing and marketing facilities, and little encouragement through research, extension, or public aid.

One result of these handicaps is the inadequate price farmers get for their stumpage in this pine belt. Another is that a tree is sold prematurely as soon as merchantable, even though if left to grow it would increase in value at a faster rate than would money obtained from the sale of the tree and invested elsewhere. So hard pressed is the farmer to make both ends meet that the old adage - "a bird in the hand is worth two in the bush" - is practiced literally by him and to his ultimate economic disadvantage.

Before small forests, many of which are parts of farms, can contribute as they should to California's rural economy; before they can help relieve distress and give the farmer a "boost" by raising his purchasing power, obstacles like those mentioned above must be ironed out. To do this will require help by public agencies, both State and Federal.

Summed up, some of the main problems of farm, non-farm, and industrially owned forest lands are:

1. Completing the change already begun from quick liquidation to forest management so that California's remaining old growth forests will not run the liquidation gauntlet.

2. Stopping forest destruction caused by poor cutting practices or inadequate protection, and reversing this process.

3. Correcting overloads of inaccessible stumpage, excess mill capacity, complex ownerships, tax handicaps, and similar economic barriers that make sustained yield forestry exceedingly difficult.

4. Solving a special group of problems on non-commercial protection forests and on wood-producing forests in small ownerships.

PUBLIC OWNERSHIP

The public owns one-half of the commercial timber land in California as well as one-half the total forested area, which includes both commercial and non-commercial forests. On this commercial timber land are 90 billion feet, board measure, or 40 percent of California's entire sawtimber supply. Although 40 percent of the total annual growth occurs in public commercial forests, they furnish only 12 percent of the annual cut, mainly because cutting is regulated and public timber is located in the more inaccessible districts.

The non-commercial forests consist mainly of stands withdrawn for recreational use, forests mainly valuable for protecting watersheds, and woodland-grass areas used for cordwood production and grazing purposes. Administration of the bulk of California's public forest land is by the Federal Government.

County and Municipal Forests

About 236,000 acres of forest land in California are owned by counties or municipalities, most of which is unsuitable for timber production and valuable mainly for watershed protection or wildlife refuges. The best example of such a protection forest is the chaparral-covered foothills area east of Los Angeles which is now owned in part by Los Angeles County. Management consists principally of fire protection, recreational developments, and prevention of trespass. Management for timber production can hardly be considered on most existing county and municipal forest holdings because of the priority of other land uses or because the land will not support tree growth suitable for lumber.

There is a need for acquisition of more community forests primarily to protect public watershed values, yet some of these might also be managed for timber production. Possible sites are along the timbered slopes which border the heavily populated Santa Clara Valley and Redwood City localities.

State Forests

The State of California owns about 413,000 acres of forest land. Nearly 90 percent, or 370,000 acres, is protection forest or is administered for park or recreational use. The remaining 10 percent, or 45,000 acres is primarily suitable and available for timber production, yet only about 5,000 acres support stands of mature timber. The other 40,000 acres are partly stocked with second growth or non-restocking. The State-owned forest land is scattered mainly on school sections throughout the pine region of the Sierra, although a few isolated blocks do occur in the redwood region. Except for two small experimental tracts, Blodgett and Whitaker Forests, owned and administered by the University of California, management of State-owned commercial forest land is confined mainly to protection from fire. The only sizable block of land set aside specifically as a State forest is the La Tour State Forest of 9,000 acres in Shasta County, over half of which supports mature timber.

The main needs are to block up State-owned forest lands into suitable administrative units, and legislation to permit management of these forests for timber production. Several areas are particularly suitable for acquisition as State forests, two of which are the proposed Loma Prieta State Forest in the Santa Cruz Mountains and the Cobb Mountain area in the Coast Range north of San Francisco.

National Forests

These Federally-owned and managed public properties consist of lands reserved from the public domain, largely after the best and most accessible of it had been converted to private ownership, plus lands acquired from private owners for watershed protection, for the growing of timber and for supplying other forest land products and services. National Forests and purchase units are now located in 40 States, Alaska, and Puerto Rico. The total net area in the national-forest system is about 176 million acres, or approximately 1-3/4 times the area of the State of California. In general, National Forests are timbered, but they include an intermixture of grasslands, incidental farm lands, and in the mountainous country of the West, a substantial acreage of alpine and sub-alpine country above the commercial timber zone.

In California, the National Forests embrace 19.5 million acres of Federal land. They are concentrated mainly along the mountain ranges which surround the great central valleys of the State, and extend from the redwood forests along the Pacific, across the Douglas fir slopes of the north Coast Range, to the ponderosa pine stands in the northeast corner of the State, thence southward through the pine-fir, and sub-alpine forests of the Sierra Nevada. In southwestern California they

include a large portion of the chaparral forests which blanket the slopes of the south Coast Range. Thirty-two percent, or 6,696,000 acres, is commercial timberland primarily suitable for growing timber crops. Forty-eight percent, or 9,290,000 acres, is either chaparral forest or alpine and sub-alpine forest above the commercial timber line. The remainder is non-forest land, either intermingled grassland areas or high barren mountain tops.

The many different types of land in the National Forests, and their resources, are so intermingled that no one type of land, no one major area, and no one resource, can be segregated and administered separately without increasing costs, complicating management of the other resources and the whole area, and reducing total net benefits. A distinctive characteristic of National Forest administration by the Forest Service of the United States Department of Agriculture is the multiple-use plan of management. In essence this plan adjusts each land service to every other, uses a given area for several purposes, and produces maximum combined values.

The problems affecting National Forest lands relate particularly to the protection, use, and proper development of four major forest resources: water, timber, forage, and recreation.

Water and Its Problems

The water that is the lifeblood for all agriculture in California and an essential commodity for the maintenance of our large urban and industrial centers has its source mainly in the headwaters of streams in the National Forests. All great rivers in the State, the Sacramento and its tributaries such as the McCloud and Pit in the north, the American, Tuolumne, San Joaquin, and others, originate from streams that rise in National Forests. A well-managed forested watershed that is relatively undisturbed by severe logging practice, grazing, or fires, tends to sustain streamflow over a relatively long period. The water is held back temporarily on forested slopes and is released gradually to stream channels, which means that the water table is maintained for days, weeks, and even months after storm periods. Under these optimum conditions water is available for irrigation, power dams, and domestic services well along into the dry California summers.

The crux of the water problem on National Forests rests with the condition of the vegetation cover, be that commercial timber, range forage, or chapparal. Effective fire prevention and, when necessary, restoration of cover by artificial means are two principal phases of the water problem. Particularly in southern California is this true where a combination of highly inflammable cover, difficult terrain, and dry climate makes control of fires extremely difficult. It is in these areas, where storms are often torrential in character, that the consequences of cover destruction are felt most critically. A spectacular example of storm damage aggravated by destruction of chaparral-covered watersheds in the Los Angeles area was the La Crescenta flood of New Year's Eve 1934. This catastrophe took the lives of about 40 people and caused property damage of $5,000,000, including the destruction of several hundred homes. The intensity of flood damage in the

highly developed valley was undoubtedly heightened by the torrents and debris which swept unhindered from the denuded portions of the upper watershed that had been deforested during a disastrous fire two months previous.

Where natural processes are slow, artificial revegetation becomes especially important. In the National Forests of southern California complete natural revegetation of the watersheds may take 15 to 20 years after intensive fires have destroyed the cover. Another example of devastation is on the Kennett smelter area in northern California where poisonous gases denuded about 150,000 acres some 30 years ago. Today this is still a man-made desert. Unfortunately, this barren waste lies on the watershed of the Shasta dam, behind what will be the largest reservoir in the State. Some of the critically over-grazed ranges taken over by the National Forests about 30 years ago on the headwater streams of the Sierra Nevada have not been fully restored as yet, while the same situation holds true for certain cut-over lands transferred to Federal ownership at the same time. Natural cover on upstream watersheds must be restored if dams and other engineering structures are to return their maximum benefits.

Timber and Its Problems

The most critical timber problem on public lands pertains to the difficulty of properly managing for use the 90 billion feet of government timber and adjacent private holdings. The Forest Service has attempted to secure the cutting of timber through sustained-yield management plans which definitely encourage a stable forest economy within natural timber units by maintenance of a permanent source of wood products and a permanent outlet for local labor. In many of these natural units public timber is so interspersed with private holdings that if liquidation of private timber continues, the whole unit is jeopardized. Public and private holdings must often be logged concurrently if economical sustained-yield management is to succeed; otherwise, not only will stumpage values for public timber seriously decline, but all hope for continuation of lumbering after private holdings have been logged off will be postponed indefinitely. Timber camps will have to shut down and populations may be stranded without possibility for local employment. At present, 48 percent of the National Forest acreage is under a degree of sustained-yield management; and this has been possible largely because the public controls key areas in these particular localities.

Table 3. - Status of Forest Practice on National Forest Commercial Timber Lands in California

Management Class	Area	Percent
	thousand acres	
Total area	6,696	100
Intensive sustained-yield management	0	-
Extensive sustained-yield management	3,197	48
Extensive management, not sustained yield	2,821	42
Unsatisfactory condition, receiving only fire protection	678	10

Unsatisfactory control of fire, insects, and diseases which threaten forest values presents a second major problem. Losses from any of these agencies diminish the immediate or potential returns from lumbering. In some cases the partial losses from these sources have been so great in merchantable stands of timber as to nullify any possibility for salvaging remaining timber values by logging. Although fire protection on National Forest lands in California is approaching adequacy, the proper protection from insects and disease is by no means assured. The western pine beetle, in epidemic proportions, has already seriously depleted mature stands of ponderosa pine on the east slope of the Sierra. Disease in the form of white pine blister rust is slowly moving southward into the California timber belt, and unless checked may exterminate whole tracts of sugar pine, one of the most valuable commercial tree species in the whole country.

Still another timber problem originates from the condition of certain public cut-over areas acquired from private owners after logging. Some 674,000 acres or 10 percent of the total commercial National Forest land in California has never satisfactorily restocked since cutting, due mainly to destructive logging methods and repeated post logging fires. If these lands are to be put on a productive basis for timber in the relatively near future, artificial replanting is essential.

Forage and Its Problems

Many National Forest lands are valuable for grazing. Approximately 125,000 cattle and horses and about 300,000 sheep are grazed on California's National Forests during the summer. Thus these mountain ranges form an integral part of the forage resource essential to

maintenance of livestock production which is one of the State's major basic industries. National Forest ranges are managed on a conservative basis of use which will protect range plants from permanent injury, and so maintain the forage capital. However, over-grazing was prevalent on many ranges prior to their inclusion in National Forests, and the attainment of proper stocking has been a slow process in some instances due to a number of factors. There has been a lack of needed range improvements, such as fencing and water developments, and priority of range use has sometimes slowed up needed reductions in the number of stock grazed. In a few cases lack of technical knowledge has prevented recognition of over-grazing. Technical manpower is not sufficient to permit a proper periodic inventory of public range resources and determination of proper use.

Lack of control of range units is another problem. Just as in the case of natural economic timber units, the public range allotments are interspersed with private lands. Private owners often hold the key to range administration when they control water holes, springs, and meadows. Without full cooperation from private owners, the administrator of public lands cannot introduce range improvement practices even where they may be sorely needed.

Conflicts between use of range by domestic livestock and deer often aggravate the range management problem. The deer herds of California graze on National Forests during the summer and compete for available forage with domestic stock, particularly with sheep. Deer now number 260,000 on National Forests and have multiplied so rapidly in recent years that serious forage shortages often occur. There must be a place for dual use by wildlife and livestock on public ranges, since both sportsmen and stockmen have a large stake in the National Forests.

Results of over-grazing on public lands involve deterioration of the range, with elimination, or serious reduction, of valuable forage plants, thus causing a gradual decrease in the amount of livestock food. The land may also be so stripped of vegetation that erosion results and flood hazards are increased. All of these effects indirectly contribute to economic instability in the livestock industry.

Recreation and Its Problems

The Forest Service program is to provide for convenient and safe recreation sites and for low cost public camping and picnic grounds through establishment of sanitary facilities and other simple improvements. Nearly 10 million people, exclusive of those merely passing through, visited the National Forests of California in 1939. The lower income groups of the whole population have felt this need tremendously; for example, one-half the recreational users of National Forests fall in the income group below $2000 a year. Many of these who seek such outdoor vacations cannot afford the luxury of a hotel or private camp and must rely entirely upon the public facilities our

National Forests offer. Congestion of campers into small areas and inadequate accommodations are typical of conditions on many Forests despite the best efforts of the Forest Service to render service with inadequate personnel and funds. More public campgrounds and organization camps with simple layouts are needed, where people may enjoy a vacation at low cost.

Over-all Problems Affecting All Resources.

As far as public lands are concerned, the major over-all problems are:

1. Lack of public ownership and control over key areas where public management is necessary. Private ownership of small strategic bodies of timber, meadows, water holes, and desirable recreation sites is common within National Forests. Such private control often conflicts with the management objectives of adjacent public lands since it is rarely possible to integrate public and private properties into workable management units.

2. The inability to do a businesslike job of forest protection, resource development, and timber and range administration without effective public cooperation and support both in terms of money and in attitude of mind.

3. The multiplicity of governmental organizations having to do with one phase or another of the whole forestry venture on public lands. The net effect, insofar as management of the National Forests is concerned, is the inability to fully control and coordinate all of the forest uses so that they may most fully contribute to the output of commodities and services and most fully stabilize dependent businesses and communities. This may mean duplication of administrative effort by several governmental bureaus or departments in cases where the spheres of authority overlap or are intermingled within a single geographic unit.

LACK OF KNOWLEDGE

One important reason why we have a Nation-wide forest problem and why progress has been slow in the adoption of better forest practices has been the lack of technical knowledge. If owners, both public and private, had sound technical guidance on how to manage forest resources and on social and economic conditions and requirements, they could do a far better job. In California, so long as there is an abundance of old-growth high-quality pine and redwood, and so long as profits may be made from timber liquidation, there is little incentive to accumulate information on sound forest practices and still less incentive to apply it. This lack of knowledge has contributed to serious social and economic maladjustments, has delayed progress, increased the cost of remedial programs, and served as an alibi for both public and private owners alike.

Today we are in a transition period from forest exploitation to forest management. Information is needed to bridge the gap between what we know and what we need to know if this period is to be developed successfully. There are two, and only two, methods of acquiring knowledge. One is through experience--trial and error--but this method is slow, costly in the extreme, and yields only fragmentary results. The second is the research method, which is now commonly accepted as being the more economical, more positive, and less time-consuming. The practical value of organized study and research has been demonstrated time and again in many fields, of which medicine, radio, and aircraft manufacture are only a few examples. But forest research has lagged; we do not know essential facts. And forest extension has lagged, too; we do not put into practice the facts that we do know.

Throughout the Nation the only private enterprises that can accomplish much forest research are a few large business enterprises and trade associations. The public is going to have to do the job if it is done at all. State agencies and universities should share heavily in the program, but a large part of it will have to be done by appropriate Federal offices.

In California, the number of complex problems that confront managers of private and public forest lands exhaust the present research facilities of agencies that must contribute to their solution. The best that can be done is to single out a few of the more critical problems for some detailed attention, and for many other important problems offer short-cut methods as a sort of rule-of-thumb technique. Incipient problems that are beginning to show up will have to be handled in the near future without benefit of research information. Those that concern us most are the ones that will seriously affect land management in the future because today we fail to build up a body of facts on which to base sound policy and action. A few examples are:

1. There is a belt of second-growth pine along the western Sierra Nevada that survived early-day logging and subsequent fires, a belt of at least 1½ million acres occupying the finest and most accessible timber sites in California. Here is a potential forest property of high value, ideally suited for small enterprise, for picking up the unemployment slack in "cow counties," and rich in possibilities of adding to the income of marginal farmers. Hacking and hewing in this belt have already started with utter disregard for the outcome. Even those who are attempting to handle these lands properly lack basic information on how to perpetuate the crop, secure maximum yields, or maintain the desirable species; yet practically nothing is being done in this important field.

2. Owners of extensive stretches of range lands adjacent to and intermingled with our forests are anxious to rebuild their properties toward original grazing capacities. The possibilities of revegetation or conversion of present forage to more desirable species may be very large, but the answer cannot be secured by wishful thinking or snap judgment. It will require a decade of hard work in research.

3. Vast areas of brushfields throughout the State, some of which were formerly in forest, are subjected to severe annual fires in order to induce some production of forage. A half-century of such treatment has been of doubtful value in producing forage and may seriously impair watershed values. No attempt is being made by owners to replace undesirable brush species with desirable forage plants. Solution of this problem would substantially reduce fire losses in California and could offset shortages in range feed.

4. Water development and flood control will continue to have a very prominent place in the development of the West. Under the general program for flood control at least a billion dollars will be spent in California alone in the next 10 to 15 years. If ever a problem required careful consideration of its every aspect to insure sound expenditure of large public funds, this is an outstanding example.

In the last analysis any sound forest program must be predicated upon an accurate appraisal and solution of economic obstacles, and the effectiveness of specific policies must be weighed from the standpoint of net returns to the individual, community, region, and Nation. There is always the searching question, "does or will it pay?" in the broadest social and economic terms.

Although a start has been made in forest taxation, insurance, price research, and logging cost studies, the field is still practically untouched. Investigations of the financial possibilities of private forestry, of forest land planning, and of good marketing practice, especially for the small operator, ought to be materially extended. A survey of forest resources has been completed for most forest regions in the country but is still in its initial planning phases in California. Still largely unsolved are important problems such as social aspects of sustained-yield forest management, financial structure of forest industries, and the question of adequate forest credits. One major problem, practically untouched, is how the forest can best aid in wiping out unemployment. Intensive forest practices, based on sound economic principles, can go far toward supplying productive employment and economic returns satisfactory for labor, the landowner, and the manufacturer. There is probably no one thing that will do more to encourage the practice of private forestry than to show how to make forestry pay--both financially and socially.

HUMAN AND SOCIAL PROBLEMS

All of the preceding adds up to the problems of human beings who live upon and use our forest land. Their ultimate well-being is basically far more important than problems of the land itself. Here in California, rural slums, forest unemployment and ghost towns are not yet so critical as in certain other parts of the country, but this is due to youth and the abundance of nature's endowments, not to foresight or wise land use. It is well to heed what is going on elsewhere in order to avoid its repetition here.

In southern Indiana, Illinois, and Ohio, in the southeastern Appalachians, the deep South, and the cut-over parts of the Lake States, it is the same old story of forest devastation followed by rural distress and pitiful poverty of the people. For example, in one cut-over county in Wisconsin, 1135 of the 1350 scattered farms were classed as poor. The annual cash income per farm during the past 5 years has averaged about $300. Seventy-five per cent of the families are poorly housed in an area which once supported what were regarded as inexhaustible forests. Sixty-seven percent of the families were receiving relief, or had been, by May 1935. State aid to the county in excess of taxes averaged $92,000 annually from 1913 to 1933. Federal relief for 1932 to 1936 totalled $700,000.

The extent to which human and social problems are affected by the whole national-forest system is indicated by the fact that there are now about 4 million people living within or close to those properties and that most of these people depend on National Forests for all, or part, of their income on timber harvesting, on livestock production, on water for irrigation, power, or industrial use, and on serving recreationists.

The ghost towns of the Lake States are classics, but they are creeping into the West as well, and even into California. In the Pacific Northwest, there are at least 76 towns which have disappeared that were formerly devoted to woods products industries, and another 77 towns in which decline of population is associated with abandonment of mills. The virgin timber of the Grays Harbor district is now rapidly approaching extinction and its people are desperately searching for some other means of support.

Here in this State, Santa Cruz County, for example, was one of the leaders in lumber production during the '80's and '90's. Its scores of sawmills and other woods operations often cut 100 million board feet of timber annually and supported thousands of people when lumbering was the leading industry of the county. Today only two sawmills remain to harvest the remnants of virgin redwood forests which once covered over half the county. When the lumbering boom subsided for lack of raw materials in the early 1900's, the shock to tax structure and general county economy, including unemployment rolls, was fortunately cushioned by rapid development of a local recreational business. Thus, some industrial centers like Boulder Creek, with a population of about 5,000 dependent on lumbering, avoided becoming ghost towns only by catering to a resort-minded public when the timber ran out.

Nevada and Placer Counties in the foothill region of the Sierra also ranked high in California timber production for several decades after a transcontinental railroad tapped their seemingly inexhaustible forests in the 1860's. Their combined output reached nearly 100 million feet of wood products a year and then sharply declined to less than one-tenth of that figure when the bulk of the accessible forests had been removed. Once thriving towns such as Towle, Boca, Emigrant

Gap, and Hobarts are today only mouldering ghost camps and sawdust. Here, fortunately, the mining industry partly assimilated stranded mill populations, but for hundreds of families the only alternatives were emigration from the county or a place on relief rolls. The population in Nevada County alone declined by half from 1880 to 1920, and a declining woods industry was a material factor in this trend.

Yet our forests are living things. Instead of being exploited, they can be cropped. Instead of being slashed, leaving ghost towns and rural slums, they can, through harvesting, contribute stability and security year after year to dependent rural and urban families and communities. Instead of being so treated that they add to the Nation's relief load, forests can be so used that they help to reduce that load. Instead of impairing a basic resource and creating social and economic problems through misuse or non-use, forests through wise use can create new and permanent wealth and help solve those problems.

In solving our over-all forest problem wisely and well, California and the whole United States will be better prepared for any emergency of peace or war; and will, in short, be a better place in which to live.

APPENDIX -- IMPORTANT FOREST STATISTICS

UNITED STATES

The data for the following four tables are for the continental United States, exclusive of Alaska.

Ownership of Forest Land

Ownership Class	Total	Commercial [1]	Non-commercial [1]
	Million acres	Million acres	Million acres
Private:			
Farm woodland	186	139	47
Industrial and other	248	202	46
Total	434	341	93
Public:			
Community	8	7	1
State	19	17	2
Indian reservations	12	6	6
National parks and monuments	6	-	6
Public domain	24	5	19
National forests	122	82	40
Other Federal	5	4	1
Total	196	121	75
All classes	630	462	168

1/ For definitions of commercial and non-commercial forest land see footnote to Table 1, page 4.

Type of Management on Forest Lands in Different Kinds of Ownership

Management status of forest land	Industrial and other non-farm forests		Farm forests		National Forests	
	Million acres	Percent	Million acres	Percent	Million acres	Percent
Total area, commercial forest	202.1	100.0	139.0	100.0	81.5	100.0
Intensive sustained yield management	3.9	1.9	1.6	1.2	3.4	4.2
Extensive sustained yield management	7.5	3.7	9.7	7.0	-	-
Extensive management, not sustained yield	17.2	8.5	30.0	21.6	3.5	4.3
Additional lands at least partially productive	136.8 1/	67.7	76.2	54.8	35.9 2/	44.0
Poor or non-restocking	36.7	18.2	21.5	15.4	5.4	6.7

1/ Two-thirds or less with organized fire protection, without assurance of future management.

2/ All lands protected against fire with management assured as timber cutting becomes possible.

Timber Stand

Total, sawtimber and cordwood	519	billion cu. ft.
Total saw timber	1764	billion bd. ft.
Old-growth saw timber	1267	" " "
Second-growth saw timber	497	" " "

Timber Drain, Growth, and Requirements

Total drain in 1936, a sub-normal year	13.5	billion cu. ft.
Total current growth	11.3	" " "
Total potential growth under Forest Program	21.4	" " "
Total domestic requirements now in sight	15.6	" " "
Total margin for increased use, now uses, losses, safety factor, and export	5.8	" " "
Saw timber drain, 1936	47.8	billion bd. ft.
Current growth saw timber	32.0	" " "
Potential growth saw timber	68.0	" " "
Domestic saw timber requirements now in sight	51.0	" " "
Margin for saw timber	17.0	" " "

CALIFORNIA

The following data are for the State of California unless otherwise specifically indicated.

Statistics on the ownership and management of California forest lands are given in Tables 1, 2 and 3, pages 4, 7 and 13.

Areas of Forest Land

	Million acres
Total forest land	48.1
Commercial forest land, or that suitable and available for timber growing	13.6
Non-commercial forest land, or that suitable or available only for other purposes than timber growing	34.5
Forest land important for watershed protection	43.3
Forest ranges	20.0
Crop land in farms	8.7
Total land area	99.6

National Forest Areas

	Million acres
Gross area within boundaries	24.2
Private and other interior holdings	4.7
Net area	19.5
Intermingled grass and alpine country	3.5
Area of forest land	16.0
Commercial forest	6.7
Non-commercial forest	9.3

Areas of Commercial Forest Land, by Condition of Stand

	Thousand Acres
Old-growth saw timber, Pine region	7,803
" " " " , Redwood region	850
Second-growth saw timber, Pine region	1,107
" " " " , Redwood region	50
Cordwood	278
Fair to satisfactory restocking	209
Poor to non-restocking	3,358

Timber Stand in Cubic Feet and Board Feet

Total	63 billion cu. ft.
Total saw timber	213 billion bd. ft.
Old-growth saw timber, Pine region	150 " " "
" " " " , Redwood region	56 " " "
Second-growth saw timber, Pine region	6 " " "
" " " " , Redwood region	1 " " "
Total cordwood	163 million cords

Timber Stand by Species

	Pine region	Redwood region
	Billion board feet	
Ponderosa pine	54.5	-
Sugar pine	19.8	-
Incense cedar	7.6	-
White fir	30.4	2.3
Red fir	8.0	-
Douglas fir	35.9	15.5
Redwood	-	39.1
Other	.3	.1
Total	156.5	57.0

Annual Timber Growth, Drain, and Requirements

	Combined sawtimber and cordwood	Sawtimber only
	Million Cu. ft.	Million Bd. ft.
Total growth	154.6	414.2
Growth pine region	121.4	337.5
Growth redwood region	33.2	76.7
Total drain	501.3	2,649.3
From fire	25.3	110.5
From insects	125.1	620.0
From disease	-	-
From all wood utilization	350.9	1,918.8
From wood cut for lumber only	283.3	1,647.1
Ratio drain to growth	3.2	6.4
Total potential growth under program recommended	421.8	-
Total domestic requirements now in sight	500.0	2,300.0

Lumber Distribution and Consumption, 1920-34

Annual per capita consumption, United States	248	board feet
Annual per capita consumption, California	566	" "
Origin of lumber consumed in California		
Derived from within State	33	percent
Derived from other states	65	"
Foreign imports	2	"
Distribution of lumber produced in California		
Consumed within State	67	"
Shipped to other states	28	"
Foreign exports	5	"

Forest Fires, 1939

Total area, Federal, State and private lands with organized protection	37.9	million acres
Total area, State and private lands without organized protection but needing it	1.7	" "
Total number of fires	5,504	" "
Total area burned	621	thousand acres
Total damage	1.5	million dollars
Main causes of forest fires		
Lightning	36	percent
Smokers	26	"
Debris burning	11	"

Principal Forest Products, 1937

	No. of establishments	Average No. of wage earners	Value of products
			Million dollars
Lumber and timber products	177	17,977	56.6
Paper and allied products	105	5,313	43.0
Planing mill products	271	5,769	34.6
Furniture	293	7,311	30.2
Wooden boxes, except cigar boxes	68	1,560	9.2

Farm Forest Products, 1937

Number of farms with woodland	39,093	
Value of forest products grown and used on farms	2.5	million dollars
Value of forest products bought for use on farms	10.0	" "
Principal forest product grown and used on farms	Fuelwood	
Principal forest product bought for use on farms	Lumber	

National Forest Ranges

Area - millions of acres.	10.7
Grazing capacity	
Thousands of cow months.	607.9
and	
Thousands of sheep months.	1,033.3
Number, stock permittees on national forests.	3,000 +
Deer population on national forests	260,000
Annual deer kill on national forests (year 1938). .	18,000
Value of livestock (cattle and sheep) on farms and ranges of California - millions of dollars. .	116.8

Forest Recreation

National forest and park visitors (exclusive of those merely passing through)	
Year 1929, millions of people.	5.6
Year 1939, " " "	9.7
Expenditures by recreationists on National Forests, 1939, - millions of dollars	19.8

Watersheds

Area forest land important for watershed protection, millions of acres	43.3
Estimated future flood damage over 50-year period, based on present conditions, Los Angeles River watershed, millions of dollars.	256.
Irrigated area depending on partly forested watersheds for water supply - millions of acres.	4.7
Investment in California agriculture, depending on irrigation water from partly forested watershed (in 1930), millions of dollars.	2,889.